Enhanced photo catalytic activity of ZnO-NiO nanocomposites synthesized through a facile sonochemcial route

PROJECT REPORT

(2013-2018)

Awarding letter No: F.PDFSS/ 2012-13- SC-KER-2859

Submitted to

University Grants Commission, UGC New Delhi

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4. SUMMARRY AND CONCLUSION

Nanostructured ZnO, NiO and ZnO-NiO composites with varying percentage of NiO were successfully synthesized through a facile sonochemical route. Structural and morphological studies were done using XRD, SEM and TEM techniques. Formation of ZnO-NiO heterojuctions in the composites was evident in the HRTEM images. The optical properties of the samples were studied using UV-Visible DRS spectroscopic analysis and Photoluminescence spectroscopy. In the case of ZnO-NiO nanocomposites, over and above the absorption above the band gap, absorption at lower energies corresponding to the d-d transition of NiO were clearly evident. The band to band emission of ZnO was suppressed in the composites due to the formation of ZnO-NiO heterojuctions. This separation of photogenerated charge carriers is advantageous for photocatalytic action. Photocatalytic decomposition of methylene blue dye under solar irradiation reveals that the photocatalytic action increased with increase in the percentage of NiO in the composite and for sample E having largest fraction of NiO, the rate constant is almost six times larger than that for pure ZnO. The facile sonochemical method depicted in this work is found to be effective in synthesising ZnO-NiO nanocomposites with enhanced photocataytic activity.